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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/834,343	04/12/2001	Michael Barnes	005651/ETCH/CHMBR/JBI	2414

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APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER

CROWELL, ANNA M

ART UNIT	PAPER NUMBER
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1763

8

DATE MAILED: 06/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/834,343	Applicant(s) BARNES ET AL.	
	Examiner Michelle Crowell	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 14-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 05 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>8</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Note. Claims 11-13 have been cancelled per applicants request.

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on March 5, 2003 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 8-9, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Frankel et al. (U.S. 6,019,848).

Referring to Figures 2, 4, 5 and column 24, lines 43-63, column 26, lines 30-38, and

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column 27, lines 24-63, Frankel et al. discloses a plasma CVD apparatus 10 comprising an enclosure assembly 200 (chamber), an upper plate 301, a lower plate 20, and mounting screws 303, 305 (plurality of pins) (col. 27, lines 28-29). The mounting screws 303, 305 connect and secure the plates 301, 20 to the inner lid assembly 230. Both plates 301, 20 include a plurality of gas dispersion holes 325, 315 to uniformly disperse process gases. The plates 301, 20 are made of aluminum (col. 27, line 32). Likewise, the outer lid assembly and the inner lid assembly 230 are made of aluminum (col. 24, lines 43-51). As seen in Figure 4, the inner lid assembly 230 is disposed over plate 301. In addition, a chamber 317 (plenum chamber) is formed between the plates 301 and 20.

During plasma processing, a high voltage RF power is supplied to a RF feed/gas-through box (not shown) connected to passages 83, 85 (col. 26, lines 30-38). This RF power supply transfers RF energy through the plates 301, 20.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2-4, 6, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (U.S. 6,019,848) in view of Tomoyasu et al. (U.S. 5,888,907).

The teachings of Frankel et al. have been discussed above.

Frankel et al. fails to teach a dielectric cover.

Referring to Figures 1 and 4, and column 5, lines 44-58, Tomoyasu et al. teaches a showerhead 30 including an electrode plate 40 (dielectric cover), a head body 42, and gas spouting holes 36, 38. Gas spouting holes 36, 38 are provided in the showerhead 30 to supply reactive and inactive gases. The electrode plate 40 is made of a conductive material such as silicon carbide or amorphous carbon (ceramic materials). The electrode plate 40 directs radicals to the wafer W. In addition, the electrode plate 40 is bonded to the head body 42. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lower plate of Frankel et al. with the dielectric cover as taught by Tomoyasu et al. This would direct radicals to the wafer W.

7. Claims 5, 7, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (U.S. 6,019,848) in view of Hillman (U.S. 5,997,649).

The teachings of Frankel et al. have been discussed above.

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Frankel et al. fails to show an outer ring.

Referring to Figure 1, column 7, lines 10-34, column 8, and lines 48-51, Hillman shows a showerhead assembly 20 comprising a lower insulator plate 50 (outer ring). The insulator plate 50 takes the form of an annular plate or ring (col. 7, lines 17-20). In addition, the insulator plate 50 is made of aluminum nitride (ceramic material) (col. 8, lines 48-51). The insulator plate 50 surrounds the showerhead 44 to prevent electrical contact between showerhead 44 and the chamber body 12. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the upper and lower plates of Frankel et al. with the insulator ring as shown by Hillman. This would prevent electrical contact between the chamber wall and the upper and lower plates.

Frankel et al. fails to show O-rings.

Referring to Figure 1 and column 8, lines 33-44, Hillman shows a plurality of O-ring seals 72 (first and second O-rings) and 74 are provided at various interface surfaces in order to maintain a seal between the showerhead and the insulator plates 50, 52. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the upper and lower plates of Frankel with the seals as shown by Hillman. This would prevent gases from escaping the chamber.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (U.S. 6,019,848) in view of Vukelic (U.S. 5,268,034).

The teachings of Frankel et al. have been discussed above.

Frankel et al. fails to teach aluminum pins.

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Referring to Figures 2a, 2b, 2c, column 4, lines 43-68, and column 7, lines 38-52, Vukelic teaches that it is well known to use aluminum pins 226 to connect an aluminum-perforated plate 224 (upper or lower plates) with a wall. Aluminum has good milling and manufacture properties with light weight and good temperature characteristics (col. 4, lines 23-27). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the screws of Frankel et al. out of aluminum as taught by Vukelic. Aluminum has good milling and manufacture properties with light weight and good temperature characteristics.

Response to Arguments

10. Applicant's arguments filed March 5, 2003 have been fully considered but they are not persuasive.

Applicant has argued that Frankel et al. discloses a thermal CVD apparatus, instead of a plasma CVD apparatus, fails to teach RF energy transfer through an upper and a lower plate, and that the plates 301 and 20 of the Frankel assembly are used for gas dispersion and gas distribution respectively, not for RF energy transfer.

Frankel et al. can be used as a thermal CVD apparatus; however, the invention of Frankel et al. is not simply limited to a thermal CVD apparatus. Alternatively, Frankel's invention includes a plasma CVD apparatus, and thus the apparatus is capable of transferring RF energy through both plates 20 and 301 (col. 13, lines 56-67, col. 23, line 52 – col. 24, line 9, col. 26, lines 30-35, col. 28, lines 41-44). Furthermore, when RF power is applied to the gas feedthrough box, the RF energy will be transferred through the both plates 20 and 301.

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Applicant has argued that Frankel fails to teach the provision of pins between upper and lower plate to facilitate thermal conductivity and that the mounting screws do nothing relative to thermal conductivity during RF energy transfer.

Frankel et al. satisfies this requirement by providing a plurality of pins (mounting screws 303, 305) connecting the dispersion plates 20, 301 to facilitate thermal conductivity during RF energy transfer (col. 27, lines 43-47). Additionally, the plates and pins of Frankel et al. are made of conductive materials, therefore thermal conductivity will take place between the upper and lower plates during RF energy transfer.

Applicant has argued that Frankel does not describe the lid assembly for use with RF plasma processes but incorporates Wang (USP 4,872,947) by reference.

As stated above, Frankel et al. discloses throughout the specification that the lid assembly can be used with RF plasma processes.

Applicant has argued that Wang does not teach or suggest the recited upper and lower plates for RF energy transfer, connected by a plurality of pins which facilitate thermal conductivity during RF energy transfer.

As stated above, the teachings of Frankel et al. satisfy the claimed requirement.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *AME*
June 6, 2003

Luz L. Alejandro
Luz L. Alejandro
Primary Examiner
Art Unit 1763